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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/988,585	11/20/2001	Kazuhiko Horikoshi	566.40894X00	8920

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ANTONELLI TERRY STOUT AND KRAUS
SUITE 1800
1300 NORTH SEVENTEENTH STREET
ARLINGTON, VA 22209

EXAMINER
TRAN, THIEN F

ART UNIT	PAPER NUMBER
2811	

DATE MAILED: 06/19/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/988,585	Applicant(s) HORIKOSHI ET AL.	
	Examin r Thien F Tran	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cov r sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as failing to set forth the subject matter which applicant(s) regard as their invention. Evidence that claims 1-12 fail(s) to correspond in scope with that which applicant(s) regard as the invention can be found in the specification. In the specification, applicant has stated that the device including the substrate is heated to 450^0C (page 11, lines 13-15; page 12, lines 5), and this statement indicates that the invention is different from what is defined in the claim(s) because the claims require a substrate that is not annealed (heated) but the substrate is clearly annealed(heated) as disclosed in the application.

Claims 1-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

While applicant may be his or her own lexicographer, a term in a claim may not be given a meaning repugnant to the usual meaning of that term. See *In re Hill*, 161 F.2d 367, 73 USPQ 482 (CCPA 1947). The term "unannealed glass substrate" in claims is used by the claims to mean "a glass substrate being annealed at 600^0C" (see

page 5, lines 11-14 of the application) while the accepted meaning is "a glass substrate not being annealed ". Applicant uses terminology which is totally opposite with the usual meaning of the term that a proper search of the prior art cannot be made.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 9-11, insofar as in compliance with 35 USC 112, are rejected under 35 U.S.C. 102(b) as being anticipated by Yamazaki et al. (US 6,025,630).

Yamazaki et al. discloses the claimed thin-film transistor (Fig. 2E) comprising a glass substrate (Corning 7059) 201; and formed at an upper part of said glass substrate, a channel region 208, a source region 206, a drain region 207, an insulating layer 204 and electrodes (212, 213), wherein said channel region, said source region and said drain region comprise non-monocrystalline silicon (polycrystalline silicon) formed by excimer laser method (col. 2, lines 27-35; col. 6, lines 50-60 of Yamazaki), said glass substrate 201 has the same material used by applicant for the claimed substrate (page 3, lines 26 of the application discloses an unannealed glass substrate CORNING 7059), and said insulating layer 204 covers said channel region.

Regarding claims 10-11, said insulating layer is a silicon oxide layer.

The claim limitations "formed at a temperature of 500^{0}C or below" in claim 10, "formed by oxidizing a surface of said channel region at a temperature of 500^{0}C or

below" in claim 11 are taken to be product by process limitations which carry no weight in claims drawn to structure. A product by process claim directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See In re Fessman, 180 USPQ 324, 326 (CCPA 1974); In re Marosi et al., 218 USPQ 289, 292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a " product by process" claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old and obvious product produced by a new method is not a patentable product, whether claimed in "product by process" claims or not.

Claims 1-3, 5-7, insofar as in compliance with 35 USC 112, are rejected under 35 U.S.C. 102(b) as being anticipated by Abe et al. (JP 8-195494).

Abe et al. discloses the claimed thin-film transistor (Fig. 2) comprising a high heat resisting glass substrate (Corning 7059) 1; and formed at an upper part of said glass substrate, a channel region 2, a source region (2, 7), a drain region (2, 7), a first insulating layer 3, a second insulating layer 4 and electrodes (6, 10), wherein said channel region, said source region and said drain region comprise polycrystalline silicon, said glass substrate 1 has the same material used by applicant for the claimed substrate (page 3, lines 26 of the application discloses an unannealed glass substrate CORNING 7059), and said first insulating layer 3 covers said channel region.

Regarding claim 2, said first insulating layer 3 has a layer thickness of 5 to 10 nm.

Regarding claim 3, said first insulating layer 3 is a silicon oxide layer.

Regarding claims 5-7, said second insulating layer 4 is formed above said first insulating layer 3.

The claim limitations "formed by oxidizing a surface of said channel region at a temperature of 500^0C or below" in claim 3, "formed by chemical deposition" in claim 5, "formed by physical deposition" in claim 6, "formed by spin coating" in claim 7 are taken to be product by process limitations which carry no weight in claims drawn to structure. A product by process claim directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See In re Fessman, 180 USPQ 324, 326 (CCPA 1974); In re Marosi et al., 218 USPQ 289, 292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a " product by process" claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old and obvious product produced by a new method is not a patentable product, whether claimed in "product by process" claims or not.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 12, insofar as in compliance with 35 USC 112, is rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. (US 6,025,630) in view of Yamazaki et al. (US 6,168,980).

Yamazaki et al. as described above does not explicitly disclose said insulating layer 204 being a silicon oxynitride layer. Yamazaki et al. (US 6,168,980) discloses a gate silicon oxynitride layer 13 between a channel region 17 and gate 15. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to implant nitrogen ions into the insulating layer 204 to obtain a silicon oxynitride layer as a gate insulator having a densified film structure, a high dielectric constant, and an improved withstand voltage.

The claim limitation "formed by oxynitriding a surface of said channel region at a temperature of 500^0C or below" in claim 12 is taken to be a product by process limitation which carries no weight in claims drawn to structure. A product by process claim directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See In re Fessman, 180 USPQ 324, 326 (CCPA 1974); In re Marosi et al., 218 USPQ 289, 292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a " product by process" claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old and obvious product produced by a new method is not a patentable product, whether claimed in "product by process" claims or not.

Claim 4, insofar as in compliance with 35 USC 112, is rejected under 35 U.S.C. 103(a) as being unpatentable over Abe et al. (JP 8-195494) in view of Yamazaki et al. (US 6,168,980).

Abe et al. as described above does not explicitly disclose said first insulating layer 3 being a silicon oxynitride layer. Yamazaki et al. (US 6,168,980) discloses a silicon oxynitride layer 13 above the channel region 17. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to implant nitrogen ions into the first insulating layer 3 to obtain a silicon oxynitride layer so that a thicker gate insulator 5 can be formed because of a higher dielectric constant as well as solving the problems of leak current and pinholes.

The claim limitation "formed by oxynitriding a surface of said channel region at a temperature of 500^0C or below" in claim 4 is taken to be a product by process limitation which carries no weight in claims drawn to structure. A product by process claim directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See In re Fessman, 180 USPQ 324, 326 (CCPA 1974); In re Marosi et al., 218 USPQ 289, 292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a " product by process" claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old and obvious product produced by a new method is not a patentable product, whether claimed in "product by process" claims or not.

Claim 8, insofar as in compliance with 35 USC 112, is rejected under 35 U.S.C. 103(a) as being unpatentable over Abe et al. (JP 8-195494) in view of Tsutsu (US 6,118,151).

Abe et al. as described above does not disclose a diffusion preventive layer between the surface of the glass substrate 1 and the polycrystalline silicon layer 2 comprising the channel, source and drain regions. Tsutsu discloses a silicon oxide film as a buffer layer formed between the glass substrate 1 and the semiconductor layer 2 comprising channel region 2a, source region 6a and drain region 7a (Fig. 2B and col. 7, lines 35-38). It would have been obvious to a person having ordinary skill in the art at the time the invention was made to incorporate a buffer layer as taught by Tsutsu between the glass substrate 1 and the polycrystalline silicon layer 2 of Abe et al. in order to prevent the diffusion of impurity from the glass substrate.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thien F Tran whose telephone number is (703) 308-4108. The examiner can normally be reached on 8:00AM - 4:30PM Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

tt
June 14, 2002

Thien Tran
Patent Examiner
Technology Center 2800